In [11]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sb

# Disable scientific notation for large numbers
pd.options.display.float_format = '{:.0f}'.format

# Setting display options for Pandas to show three decimal places for floati
pd.set_option('display.float_format', lambda x: '%.2f' % x)
```

Data Loading

In [12]:
```
# import data
student_df = pd.read_csv('/content/drive/MyDrive/student-mat.csv', sep=';')
```

Data Exploration

In [13]:
```
student_df.info() # Display information about the DataFrame, including data
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 395 entries, 0 to 394
Data columns (total 33 columns):
 #   Column      Non-Null Count  Dtype 
---  ------      --------------  ----- 
 0   school      395 non-null    object
 1   sex         395 non-null    object
 2   age         395 non-null    int64 
 3   address     395 non-null    object
 4   famsize     395 non-null    object
 5   Pstatus     395 non-null    object
 6   Medu        395 non-null    int64 
 7   Fedu        395 non-null    int64 
 8   Mjob        395 non-null    object
 9   Fjob        395 non-null    object
 10  reason      395 non-null    object
 11  guardian    395 non-null    object
 12  traveltime  395 non-null    int64 
 13  studytime   395 non-null    int64 
 14  failures    395 non-null    int64 
 15  schoolsup   395 non-null    object
 16  famsup      395 non-null    object
 17  paid        395 non-null    object
 18  activities  395 non-null    object
 19  nursery     395 non-null    object
 20  higher      395 non-null    object
 21  internet    395 non-null    object
 22  romantic    395 non-null    object
 23  famrel      395 non-null    int64 
 24  freetime    395 non-null    int64 
 25  goout       395 non-null    int64 
 26  Dalc        395 non-null    int64 
 27  Walc        395 non-null    int64 
 28  health      395 non-null    int64 
 29  absences    395 non-null    int64 
 30  G1          395 non-null    int64 
 31  G2          395 non-null    int64 
 32  G3          395 non-null    int64 
dtypes: int64(16), object(17)
memory usage: 102.0+ KB
```

In [14]:
```
student_df.head() # Display top 5 records
```

Out[14]:

	school	sex	age	address	famsize	Pstatus	Medu	Fedu	Mjob	Fjob
0	GP	F	18	U	GT3	A	4	4	at_home	teacher
1	GP	F	17	U	GT3	T	1	1	at_home	other
2	GP	F	15	U	LE3	T	1	1	at_home	other
3	GP	F	15	U	GT3	T	4	2	health	services
4	GP	F	16	U	GT3	T	3	3	other	other

5 rows × 33 columns

In [15]:
```
student_df.describe() # Display statistical information about Dataframe
```

Out[15]:

	age	Medu	Fedu	traveltime	studytime	failures	famrel	freetim
count	395.00	395.00	395.00	395.00	395.00	395.00	395.00	395.0
mean	16.70	2.75	2.52	1.45	2.04	0.33	3.94	3.2
std	1.28	1.09	1.09	0.70	0.84	0.74	0.90	1.0
min	15.00	0.00	0.00	1.00	1.00	0.00	1.00	1.0
25%	16.00	2.00	2.00	1.00	1.00	0.00	4.00	3.0
50%	17.00	3.00	2.00	1.00	2.00	0.00	4.00	3.0
75%	18.00	4.00	3.00	2.00	2.00	0.00	5.00	4.0
max	22.00	4.00	4.00	4.00	4.00	3.00	5.00	5.0

Data Cleaning

In [16]:
```
student_df.isna().sum() # Find sum of missing values
```

Out[16]:

	0
school	0
sex	0
age	0
address	0
famsize	0
Pstatus	0
Medu	0
Fedu	0
Mjob	0
Fjob	0
reason	0
guardian	0
traveltime	0
studytime	0
failures	0
schoolsup	0
famsup	0
paid	0
activities	0
nursery	0
higher	0
internet	0
romantic	0
famrel	0
freetime	0
goout	0
Dalc	0
Walc	0
health	0
absences	0
G1	0
G2	0
G3	0

dtype: int64

Since missing data is 0, so handling missing data is not required

In [17]:
```
print(student_df.duplicated().sum()) # Find duplicate values
```

```
0
```

Since, sum of duplicated values is zero, so there is no need to drop duplicates.

Data Analysis

Q1 : Find average score in math (G3)?

In [18]:
```
avg_score = student_df['G3'].mean()
#print(avg_score)
print(f"Average score in math (G3): {avg_score:.2f}")
```

```
Average score in math (G3): 10.42
```

Q2 : How many students scored above 15 in their final grade (G3)?

In [19]:
```
student_df[student_df['G3'] > 15].shape[0]
#len(student_df[student_df['G3'] > 15])
```

Out[19]: 40

Q3 : Is there a correlation between study time (study time) and the final grade (G3)?

In [20]:
```
correlation = student_df['studytime'].corr(student_df['G3'])
#print(correlation)
print(f"Correlation between study time and the final grade: {correlation:.2f
```

```
Correlation between study time and the final grade: 0.10
```

Q4 : Which gender has a higher average final grade (G3)?

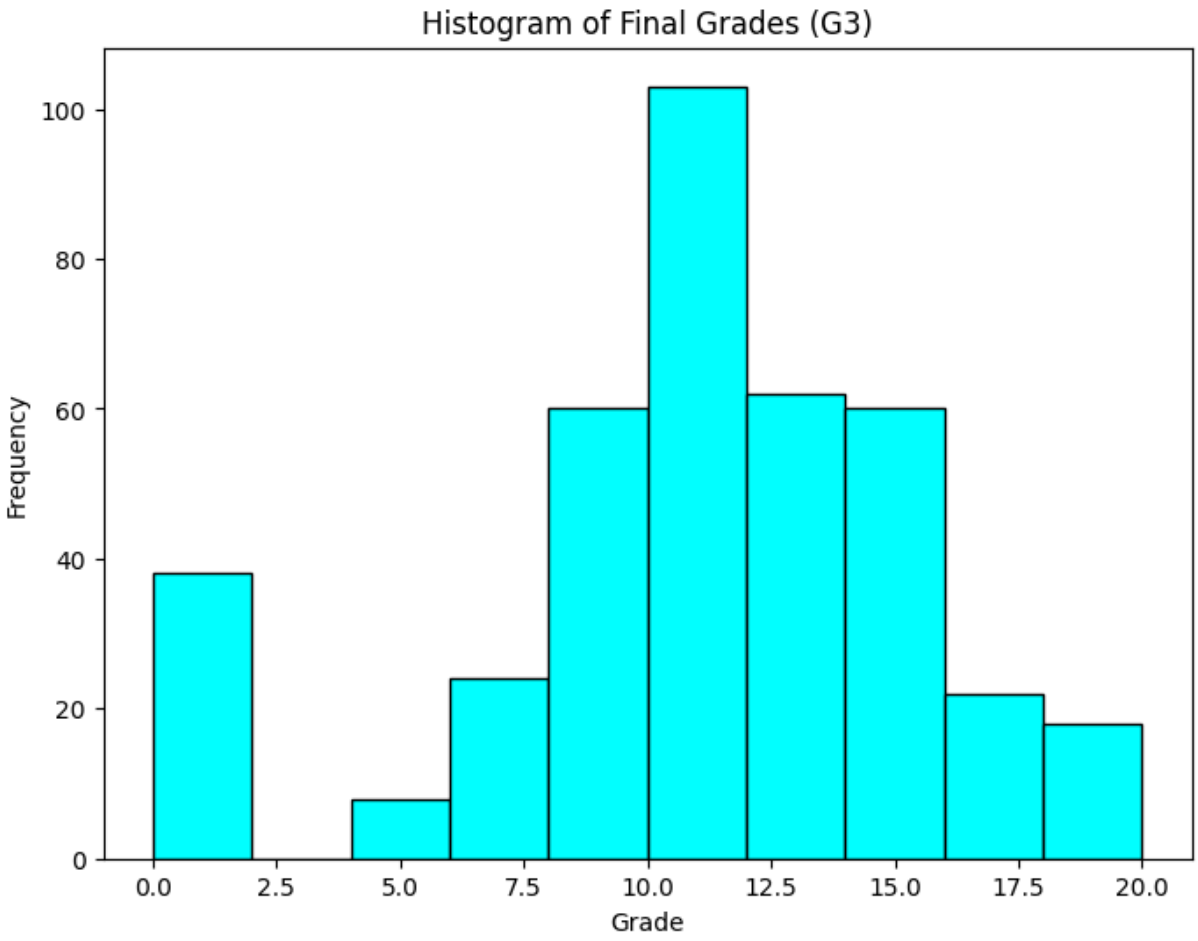
In [21]:
```
avg_grade_by_gender = student_df.groupby('sex')['G3'].mean()
print(avg_grade_by_gender)
```

```
sex
F    9.97
M   10.91
Name: G3, dtype: float64
```

Data Visualization

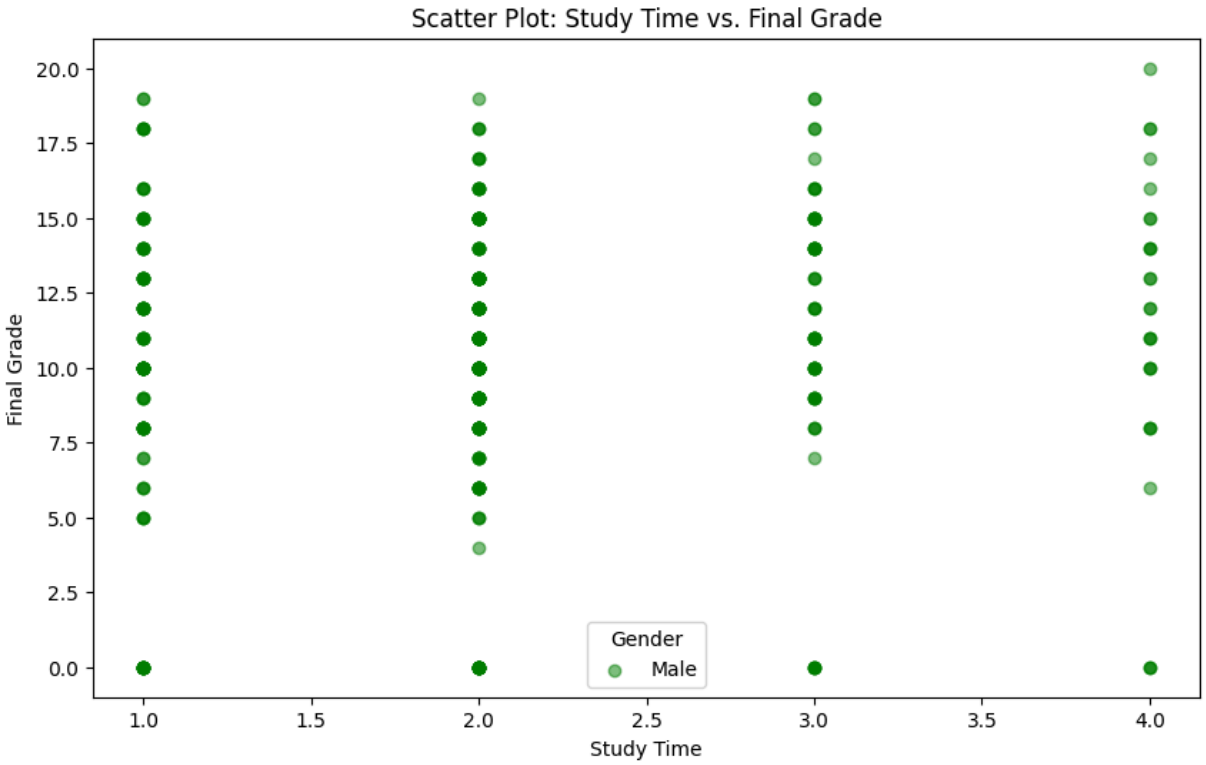
Histogram of final grades (G3)

In [22]:
```
plt.figure(figsize=(8, 6))
plt.hist(student_df['G3'], bins=10, color='aqua', edgecolor='black')
plt.title('Histogram of Final Grades (G3)')
plt.xlabel('Grade')
plt.ylabel('Frequency')
plt.show()
```



Scatter plot between study time (study time) and final grade (G3)

In [23]:
```
plt.figure(figsize=(10, 6))
plt.scatter(student_df['studytime'], student_df['G3'], alpha=0.5, color='gre
plt.title('Scatter Plot: Study Time vs. Final Grade')
plt.xlabel('Study Time')
plt.ylabel('Final Grade')
plt.legend(title='Gender', labels=['Male', 'Female'])
plt.show()
```



Bar chart comparing the average scores of male and female students

In [24]:
```
plt.figure(figsize=(8, 6))
avg_grade_by_gender.plot(kind='bar', color=['blue', 'orange'])
plt.title('Average Scores by Gender')
plt.xlabel('Gender')
plt.ylabel('Average Grade')
plt.xticks(rotation=0)
plt.show()
```